What is claimed is:

1. A method for determining whether a peptide forms a phosphorus-based ester with an organophosphorus agent comprising the steps of:
   (a) contacting the peptide with the agent under conditions permitting formation of a phosphorus-based ester; and
   (b) determining whether a phosphorus-based ester has formed between the peptide and the agent.

2. A method for determining whether, among a plurality of peptides, there exists a peptide that forms a phosphorus-based ester with an organophosphorus agent comprising the steps of:
   (a) contacting the plurality of peptides with the agent under conditions permitting formation of a phosphorus-based ester; and
   (b) determining whether a phosphorus-based ester has formed between any of the peptides and the agent, the formation of such an ester indicating that there exists a peptide that forms a phosphorus-based ester with the agent.

3. A method for identifying and characterizing a peptide, among a plurality of peptides, that forms a phosphorus-based ester with an organophosphorus agent comprising the steps of:
   (a) contacting the agent with the plurality of peptides under conditions permitting the formation of a phosphorus-based ester;

(b) identifying a peptide among the plurality of peptides that forms a phosphorus-based ester with the agent; and

(c) determining the amino acid sequence of the peptide so identified in step (b), thereby identifying and characterizing the peptide that forms a phosphorus-based ester with the agent.

4. The method of claim 1, 2 or 3, wherein the phosphorus-based ester is a phosphate ester.

5. The method of claim 1, 2 or 3, wherein the phosphorus-based ester is a phosphonate ester.

6. The method of claim 1, 2 or 3, wherein the phosphorus-based ester is a phosphinate ester.

7. The method of claim 1, 2 or 3, wherein the peptides are bound to a solid support.

8. The method of claim 7, wherein the solid support comprises a bead, a microtiter plate, a glass chip or a silicone chip.

9. The method of claim 1, 2, or 3, wherein the agent is selected from the group consisting of malathion, parathion, paraoxon, schradan, dichlorfenthion, soman, sarin, VX, GB and tabun.

10. The method of claim 9, wherein the agent is labeled with a detectable marker.

11. The method of claim 10, wherein the detectable marker is a radioisotope, a fluorescent molecule, biotin or an enzyme.

12. The method of claim 11, wherein the agent is a nerve agent and the detectable marker is rhodamine.

13. The method of claim 12, wherein the agent has the structure set forth as analog 1 in Figure 2.

14. A peptide which forms a phosphorus-based ester with an organophosphorus agent, which peptide comprises a nucleophilic functional group.

15. The peptide of claim 14, wherein the functional group is a thiol or a hydroxyl group.

16. The peptide of claim 14, wherein the length of the peptide is between six and 15 amino acid residues.

17. The peptide of claim 16, wherein the peptide has a length of six amino acid residues.

18. The peptide of claim 14, wherein the molecular weight of the peptide is less than 1500 daltons.

19. The peptide of claim 14, wherein the agent is an organophosphorus insecticide or chemical warfare agent.

20. The peptide of claim 19, wherein the agent is selected from the group consisting of malathion, parathion, paraoxon, schradan, dichlorfenthion, soman, sarin, VX, GB and tabun.

21. A peptide library, wherein each peptide therein comprises a nucleophilic functional group.

22. The library of claim 21, wherein the nucleophilic functional group is a thiol or a hydroxyl group.

23. The library of claim 22, wherein each peptide in the library comprises a thiol or hydroxyl-containing amino acid residue, and the position at which such thiol or hydroxyl-containing amino acid residue occurs is the same for each peptide in the library.

24. The library of claim 23, wherein each peptide of the library is of a fixed length.

25. The library of claim 24, wherein the length of each peptide is between six and 15 amino acid residues and/or the molecular weight of each peptide is less than 1500 daltons.

26. The library of claim 25, wherein each peptide has a length of six amino acids.

27. The library of claim 26, wherein the first, second, third, fourth, fifth or sixth amino acid residue in each hexapeptide is a serine.

28. A composition of matter comprising the peptide of claim 14, and a pharmaceutical carrier.

29. A composition of matter comprising the peptide of claim 14, and a nonpharmaceutical carrier.

30. The composition of claim 29, wherein the nonpharmaceutical carrier is a foam or an aerosol.

31. An article of manufacture comprising the peptide of claim 14 affixed to a solid substrate.

32. The article of claim 31, wherein the solid substrate is a polymer.

33. The article of claim 31, wherein the solid substrate is a fabric or fiber.

34. The article of claim 31, wherein the solid substrate is a filtration component of a gas mask.

35. A method for reducing the likelihood of injury due to exposure to an organophosphorus agent in a subject exposed to or at risk of exposure to such agent, comprising administering to the subject an effective amount of the peptide of claim 14.

36. A method for decontaminating an area exposed to an organophosphorus agent comprising introducing to the area an effective amount of the peptide of claim 14.

37. A kit for decontaminating an area exposed to an organophosphorus agent comprising the peptide of claim 14 and instructions for use.

38. A method for determining the presence of an organophosphorus agent in an area comprising the steps of:

(a) contacting the peptide of claim 14 with a sample taken from the area; and

(b) determining whether a phosphorus-based ester is formed with the peptide in step (a), the formation of such ester indicating the presence of an organophosphorus agent in the area.

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